Open-source Peer-to-Peer Environment to Enable Sensor Web Architecture

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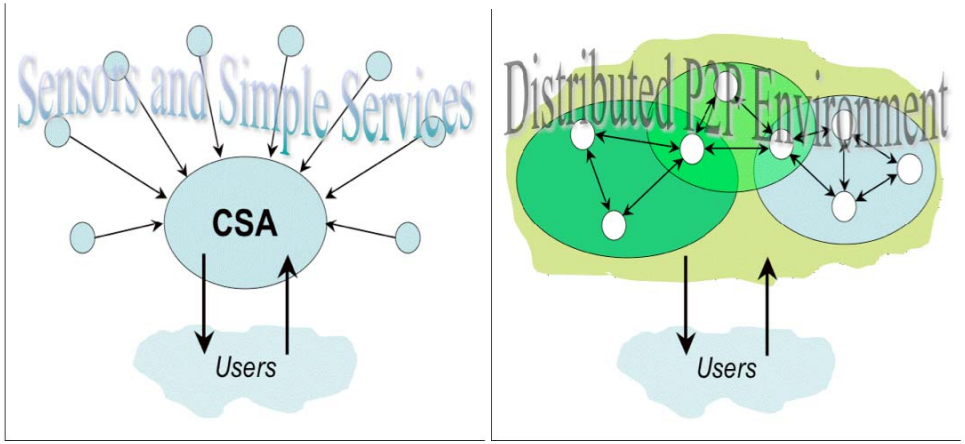
Objective

Our long-term objective is to enable an evolution of distributed Earth system sensors and related processing/storage components into elements of the Sensor Web by providing a flexible, dynamic, and reliable secure peer-to-peer (P2P) communication environment for these components. This ultimately will include dynamic monitoring, control, and configuration as well as autonomous operations, real-time modeling and data processing, and secure ubiquitous communications.



The conventional "Centralized Stand-Alone" (CSA) approach vs. our novel P2P "Science Data Environment" approach

Approach

We will be integrating "simulated" sensors and will apply our P2PSDE's low-latency messaging capabilities to the development of a suite of real-time remote monitoring and control interfaces to a multiplicity of distributed sensors. We will apply P2PSDE's rapid content-sharing capabilities to the development of modeling-peers. We will implement basic identity management features. Finally, the intuitive configuration features we will implement for the various peer-processes operating within our sensor web, as well as the intuitive graphical interfaces to these processes, will help to demonstrate how this technology might be rapidly adopted.

Key Milestones

• Implement 'Identity Store' database, etc.	02/2007
• Demo Secure test-messaging using Identity Store	03/2007
• Demo Secure sensor-messaging ("dummy" data)	04/2007
• Complete Secure sensor-messaging	06/2007
• Demo Basic Modeling from sensor-data	09/2007
• Complete Customized Modeling from sensor-data	11/2007
• Complete GUIs with sensor/model access/control	12/2007

Co-I's/Partners

Antti Pulkkinen / GSFC

TRL_{in} = 3

ESTO Earth Science Technology Office